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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/643,275	08/19/2003	Lorraine Denby	503021-A-01-US (Denby)	4069

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EXAMINER	
MEW, KEVIN D	
ART UNIT	PAPER NUMBER
2616	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/643,275	DENBY ET AL.	
	Examiner	Art Unit	
	Kevin Mew	2616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 August 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,2,5,7,8 and 14-21* is/are rejected.

7)☒ Claim(s) *3-4, 6 and 9-13* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *8/19/2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *3/19/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Detailed Action

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-2, 5, 8, 14-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over the admitted prior art, Bearden et al. (US Publication 2003/0097348 A1), in view of Kryskow, Jr. (US Publication 2003/0053455 A1).

Regarding claim 1, Bearden discloses a method for determining the location of a performance problem in a network-based communication system comprising a plurality of endpoint devices (D1 and D5 edge devices, paragraph 0081 and Fig. 3), the method comprising the steps of:

generating test communications in the system (injecting traffic flows/voice calls) in accordance with a selected pattern (representing the target application to the network in accordance with a call pattern, paragraphs 0213, 0224);

collecting end-to-end path measurement data utilizing the generated test communications (measuring and collecting end-to-end quality QoS metrics at the endpoints of each call, paragraphs 0213, 0228); and

Bearden discloses measuring and analyzing the end-to-end call statistics and indicating the performance of the monitored devices on a path with the QoS incurred by the traffic across the path (paragraphs 0052, 0225, 0230, 0231).

Bearden does not explicitly show transforming the end-to-end path measurement data to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths defined at least in part by the selected pattern.

However, Kryskow discloses apportioning end-to-end metrics to specific component metrics (paragraphs 0013, 0023, 0030).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the network topology discovery system of Bearden with the teaching of Kryskow in apportioning end-to-end metrics to specific component metrics based on the network topology information concerning path such that the system of Bearden will show transforming the end-to-end path measurement data (end-to-end metrics) to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths (specific component metrics) defined at least in part by the selected pattern.

The motivation to do so is to create a component service level agreement baseline/metrics.

Regarding claim 2, Bearden discloses the method of claim 1 wherein a given one of the test communications is directed between a first one of the endpoint devices and a second one of the endpoint devices (a traffic flow/call is directed between a pair of endpoints, paragraph 0224).

Regarding claim 5, Bearden discloses the method of claim 1 further comprising repeating the generating, collecting and transforming steps for each of a plurality of time

intervals (device monitoring and synthetic call data collected by the system are time dependent for each time slice, paragraph 0230).

Regarding claim 8, Bearden discloses the method of claim 1 wherein a network of the network-based communication system has a topology characterized by a connected network topology graph G = (D, L) where D is a set of nodes and L is a set of links, and where a given path in G comprises a sequence of links from the set L (paragraph 0081).

Regarding claim 14, Bearden and Kryskow disclose all the aspects of claim 1 above.

Bearden does not explicitly show the method of claim 1 wherein the selected pattern is determined at least in part based on a reduced network topology generated by applying a network topology reduction process to a graph representative of a topology of a network of the network-based communication system, the network topology reduction process determining one or more non-end-to-end paths within the network which carry the same traffic flow.

However, Kryskow discloses apportioning end-to-end metrics to specific component metrics (paragraphs 0013, 0023, 0030).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the network topology discovery system of Bearden with the teaching of Kryskow in apportioning end-to-end metrics to specific component metrics based on the network topology information concerning path such that the system of Bearden will show the selected pattern is determined at least in part based on a reduced network topology generated by applying a network topology reduction process to a graph representative of a topology of a

network of the network-based communication system, the network topology reduction process determining one or more non-end-to-end paths (component) within the network which carry the same traffic flow.

The motivation to do so is to create a component service level agreement baseline/metrics.

Regarding claim 15, Bearden discloses the method of claim 1 wherein the selected pattern is determined at least in part utilizing a flow matrix selection algorithm (using a sequence of calls/call pattern, paragraph 0224).

Regarding claim 16, Bearden further discloses the method of claim 15 wherein the flow matrix selection algorithm maintains a list of end-to-end paths (a sequence of calls are maintained, paragraph 0224) and processes said list such that a plurality of non-end-to-end paths for which performance indicators can be generated are determined (based on the call data collected for a given time slice, devices in the network are shaded with different colors to indicate their performance, paragraph 0230).

Regarding claim 17, Bearden also discloses the method of claim 15 wherein the flow matrix selection algorithm is configurable to accept one or more constraints (packet rate, jitter buffer size, etc, paragraph 0224) on selection of particular paths in generating a given flow matrix (on selection of calls in generating a sequence of calls, paragraph 0224).

Regarding claim 18, Bearden discloses an apparatus for use in determining the location of a performance problem in a network-based communication system, the system comprising a plurality of endpoint devices, the apparatus comprising:

a controller (endpoint software on a computer at the endpoint, paragraph 0225);

(i) generating test communications in the system (injecting traffic flows/voice calls) in accordance with a selected pattern (representing the target application to the network in accordance with a call pattern, paragraphs 0213, 0224);

(ii) collecting end-to-end path measurement data utilizing the generated test communications (measuring and collecting end-to-end quality QoS metrics at the endpoints of each call, paragraphs 0213, 0228); and

Bearden discloses measuring and analyzing the end-to-end call statistics and indicating the performance of the monitored devices on a path with the QoS incurred by the traffic across the path (paragraphs 0052, 0225, 0230, 0231).

Bearden does not explicitly show the controller comprising a processor coupled to a memory; the controller being associated with one or more of the endpoint devices, and being operative to control: the generation and collection of end-to-end path measurement data and transformation the end-to-end path measurement data to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths defined at least in part by the selected pattern.

However, Kryskow discloses a controller (master control module, Fig. 4D) comprising a CPU and local SRAM, for apportioning end-to-end metrics to specific component metrics (paragraphs 0013, 0023, 0030).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the network topology discovery system of Bearden with the teaching of Kryskow in apportioning end-to-end metrics to specific component metrics based on the network topology information concerning path such that the system of Bearden will show a controller comprising a processor coupled to a memory; the controller being associated with one or more of the endpoint devices, and being operative to control: the generation and collection of end-to-end path measurement data and transformation the end-to-end path measurement data to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths defined at least in part by the selected pattern.

The motivation to do so is introduce a hardware master control module to create a component service level agreement baseline/metrics.

Regarding claim 19, Bearden also discloses the apparatus of claim 18 wherein the controller comprises a centralized controller (call control module, paragraph 0225) which communicates with the plurality of endpoint devices over a network (communicates with endpoints, paragraph 0225).

Regarding claim 20, Bearden also discloses the apparatus of claim 18 wherein the controller comprises a distributed controller which is implemented at least in part utilizing one or more of the endpoint devices (endpoint software installed on the computer at the endpoint to send and received synthetic traffic and collect and report statistics, paragraph 0225).

Regarding claim 21, Bearden discloses an article of manufacture comprising a machine-readable storage medium containing software code for use in determining the location of a performance problem in a network-based communication system comprising a plurality of endpoint devices, wherein the software code (endpoint software, paragraph 0225) when executed implements the steps of:

generating test communications in the system (injecting traffic flows/voice calls) in accordance with a selected pattern (representing the target application to the network in accordance with a call pattern, paragraphs 0213, 0224);

collecting end-to-end path measurement data utilizing the generated test communications (measuring and collecting end-to-end quality QoS metrics at the endpoints of each call, paragraphs 0213, 0228); and

Bearden discloses measuring and analyzing the end-to-end call statistics and indicating the performance of the monitored devices on a path with the QoS incurred by the traffic across the path (paragraphs 0052, 0225, 0230, 0231).

Bearden does not explicitly show transforming the end-to-end path measurement data to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths defined at least in part by the selected pattern.

However, Kryskow discloses apportioning end-to-end metrics to specific component metrics (paragraphs 0013, 0023, 0030).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the network topology discovery system of Bearden with the teaching of Kryskow in apportioning end-to-end metrics to specific component metrics based on

the network topology information concerning path such that the system of Bearden will show transforming the end-to-end path measurement data (end-to-end metrics) to produce a plurality of performance indicators comprising a performance indicator for each of a plurality of non-end-to-end paths (specific component metrics) defined at least in part by the selected pattern.

The motivation to do so is to create a component service level agreement baseline/metrics.

2. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bearden et al. (US Publication 2003/0097348 A1) in view of Kryskow, Jr. (US Publication 2003/0053455 A1), and in further view of Waclawsky et al. (USP 5,197,127).

Regarding claim 7, Bearden and Kryskow disclose all the aspects of claim 1 above, except fail to explicitly show the method of claim 1 wherein at least one of the performance indicators comprises a binary indicator, the binary indicator taking on a first value to indicate that a corresponding link is not associated with a performance problem, and taking on a second value to indicate that the corresponding link is associated with a performance problem.

However, Waclawsky discloses a flow control system wherein the performance indicator of data flow efficiency state comprises a congest bit takes on a binary value of either 1 or 0 to indicate whether the node is congested or not (col. 4, lines 38-48 and Fig. 8).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the combined network topology discovery system of Bearden and Kryskow with the teaching of Waclawsky in using a binary value of either 1 or 0 to indicate the congested state of a network node such that at least one of the performance indicators of the

network in Bearden will comprise a binary indicator, the binary indicator taking on a first value to indicate that a corresponding link is not associated with a performance problem, and taking on a second value to indicate that the corresponding link is associated with a performance problem.

The motivation to do so is to indicate the data flow efficiency of a node by using the binary bit value to show the congested state associated with the node.

Allowable Subject Matter

3. Claims 3-4, 6, 9-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

In claim 3, the method of claim 1 wherein for a given time interval the collected end-to-end path measurement data is characterized by the equation:

$y = Ax$

where y is a vector of end-to-end path measurements, A is a flow matrix defining the selected pattern, and x is a vector of network link-level performance indicators.

In claim 6, the method of claim 5 wherein the end-to-end path measurement data corresponding to the one or more test communications generated for an ith time interval ti is of the form:

$Yi = Ai\ xi$

where yi is a vector of end-to-end path measurements collected for the ith time interval, Ai is a flow matrix defining the selected pattern for the ith time interval, and xi is a vector of network link-level performance indicators for the ith time interval.

In claim 9, the method of claim 8 wherein a node in G having an endpoint device associated therewith is designated as a leaf, and a set E C D denotes the set of leaves in G, and further wherein a path in G that lies between leaves comprises an end-to-end path, and a set P for a given G and E denotes the set of all end-to-end paths in G between endpoint devices in E.

In claim 10, the method of claim 1 wherein the selected pattern is defined by a flow matrix having rows representing end-to-end paths for which measurement data is collected in the collecting step, and columns representing single-link or multiple-link non-end-to-end paths for which performance indicators are determined in the transforming step.

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Mew whose telephone number is 571-272-3141. The examiner can normally be reached on 9:00 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema Rao can be reached on 571-272-3174. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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